

Remarks

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 3, 4, 6-10, 12, 13, 16-18, 20-32, and 35-68 are pending in the application, with 6, 13, 18, 38 and 60 being the independent claims. Claims 5 and 11 are sought to be cancelled without prejudice to or disclaimer of the subject matter therein. Claims 1, 2, 14, 15, 19, 33 and 34 were previously cancelled. Claims 18, 20-32, and 35-37 were previously withdrawn. Claims 6-8, 12, 13, 38, 51, and 60 are sought to be amended. The amendments to claims 6-8, 12, 13, 38, 51, and 60 are made to more particularly claim the present invention, not to amend around cited art, and are thus not intended to limit the range of any equivalents. For example, claims 6 and 13, are sought to be amended into independent form by merely incorporating the limitations of independent claim 38, from which they previously depended, and are amended to even more clearly recite the features of their respective embodiments. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendment and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

Examiner Interview

Applicants would like to thank Examiner Lewis for the courteous Examiner Interview conducted at the U.S. Patent and Trademark Office on July 18, 2003, with Applicants' representative Jeffrey S. Weaver, Reg. No. 45,608.

Rejections under 35 U.S.C. § 103

Claims 3, 4, 7-10, 12, 39-51, and 61-68

In paragraph 4 of the Office Action, claims 4-6, 38, 42-46, 48-50, 60, 64, 65, and 67 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,163,458 to Li (hereinafter Li) in view of U.S. Patent No. 5,648,679 to Chillara *et al.* (hereinafter Chillara) and U.S. Patent No. 6,084,777 to Plepys *et al.* (hereinafter Plepys). Applicants respectfully traverse the rejection, and request that it be withdrawn.

Technical differences exist between Li and the present invention. Independent claims 6, 38, and 60 of the present invention relate to ball grid array (BGA) packages. Claim 6, as amended, recites the following features:

a substrate having a plurality of contact pads on a first surface electrically connected through said substrate to a plurality of solder ball pads on a second surface of said substrate, wherein said substrate has a window opening that is open at said first surface and said second surface of said substrate;

a heat spreader that has a first surface and a second surface, wherein said first surface of said heat spreader is attached to said second surface of said substrate;

a ring shaped stiffener being centrally open in a first surface and a second surface, wherein said first surface of said ring shaped stiffener is attached to said first surface of said substrate; and

an integrated circuit (IC) die that is mounted to said first surface of said heat spreader and is accessible through said window opening, wherein said die has opposing first and second surfaces, said first surface of said die including at least one contact pad, said second surface of said die being mounted to said first surface of said heat spreader;

wherein said second surface of said heat spreader is capable of being coupled to a printed circuit board (PCB).

Claim 38, as amended, recites the following features:

a substrate having a plurality of contact pads on a first surface electrically connected through said substrate to a plurality of solder ball pads on a second surface of said substrate;

an integrated circuit (IC) die having opposing first and second surfaces, said first surface of said die including at least one contact pad, said second surface of said die being mounted to said first surface of said substrate;

a heat spreader that has a first surface and a second surface, wherein said first surface of said heat spreader is attached to said second surface of said substrate; and

a ring shaped stiffener being centrally open in a first surface and a second surface, wherein said first surface of said ring shaped stiffener is attached to said first surface of said substrate;

wherein said second surface of said heat spreader is capable of being coupled to a printed circuit board (PCB).

Claim 60, as amend, recites the following features:

a substrate having a plurality of contact pads on a first surface electrically connected through said substrate to a plurality of solder ball pads on a second surface of said substrate, wherein said substrate includes a window opening that is open at said first surface and said second surface of said substrate;

a heat spreader that has a first surface and a second surface, wherein said first surface of said heat spreader surface is attached to said second surface of said substrate; and

an integrated circuit (IC) die having opposing first and second surfaces, said first surface of said die including at least one contact pad, said second surface of said die being mounted to said first surface of said heat spreader that is accessible through said window opening;

wherein said second surface of said heat spreader is capable of being coupled to a printed circuit board (PCB).

Li does not teach or even suggest these features of independent claims 6, 38, and 60.

Accordingly, Applicants respectfully submit that independent claims 6, 38, and 60 are patentable over Li, for at least these reasons. Furthermore, Applicants assert that Chillara and Plepys do not supply the missing teachings. Furthermore, claims 7-9 and 50, which depend from independent claim 6, claims 3, 4, 10, 12, 39-49, and 51, which depend from independent claim 38, and claims 61-68, which depend from independent claim 60 are also patentable for at least these reasons, and further in view of their own features.

Further rejections of the dependent claims are made in subsequent paragraphs of the Office Action in view of the following references: U.S. Patent No. 6,084,777 to Kalidas *et al.* (hereinafter Kalidas), U.S. Patent No. 6,002,169 to Chia *et al.* (hereinafter Chia), U.S. Patent No. 6,212,070 to Atwood *et al.* (hereinafter Atwood), Japanese Patent No. 1018935 to Kinseisha, and Japanese Patent No. 200026294 to Shibamoto *et al.* Applicants respectfully submit that Kalidas, Chia, Atwood, Kinseisha, and Shibamoto do not supply the teachings missing from Li, Chillara and Plepys, with respect to independent claims 6, 38, and 60. Therefore, claims 3, 4, 7-10, 12, 39-51, and 61-68, which depend therefrom, are also patentable over these references for at least the reasons above, and further in view of their own features. Applicants therefore request that the Examiner reconsider and withdraw the rejection of these claims.

Claims 13, 16, 17, and 52-59

In paragraph 9 of the Office Action, claim 13 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Li in view of Chillara, Plepys, Chia, and U.S. Patent

No. 6,166,434 to Desai *et al.* (hereinafter Desai). Applicants respectfully traverse the rejection, and request that it be withdrawn.

Technical differences exist between Li and the present invention. Independent claim 13 of the present invention relates to ball grid array (BGA) packages. Claim 13, as amended, recites the following features:

a substrate having a plurality of contact pads on a first surface electrically connected through said substrate to a plurality of solder ball pads on a second surface of said substrate;

an integrated circuit (IC) die that is mounted to said first surface of said substrate;

a heat spreader that has a first surface and a second surface, wherein said first surface of said heat spreader is attached to said second surface of said substrate; and

a ring shaped stiffener being centrally open in a first surface and a second surface, wherein said first surface of said ring shaped stiffener is attached to said first surface of said substrate;

wherein said second surface of said heat spreader is capable of being coupled to a printed circuit board (PCB);

wherein said IC die is mounted to said first surface of said substrate in a flip chip configuration, wherein a conductive bump on an active surface of said IC die is connected to a conductive pad on said first surface of said substrate.

Li does not teach or even suggest these features of independent claim 13.

Accordingly, Applicants respectfully submit that independent claim 13 is patentable over Li, for at least these reasons. Furthermore, Applicants assert that Chillara, Plepys, Chia, and Desai do not supply the missing teachings. Furthermore, claims 16, 17, and 52-59, which depend from independent claim 13 are also patentable for at least these reasons, and further in view of their own features.

Further rejections of the dependent claims are made in subsequent paragraphs of the Office Action in view of Atwood and U.S. Patent No. 5,901,041 to Davies *et al.* (hereinafter Davies). Applicants respectfully submit that Atwood and Davies do not supply the teachings missing from Li, Chillara, Plepys, Chia, and Desai, with respect to independent claim 13. Therefore, claims 16, 17, and 52-59, which depend therefrom, are also patentable over these references for at least the reasons above, and further in view of their own features. Applicants therefore request that the Examiner reconsider and withdraw the rejection of these claims.

Double Patenting

Claims 3-13, 16, 17, and 38-68 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-13 of U.S. Patent Application No. 09/997,272, over claims 1 and 11-13 of U.S. Application No. 09/984,259, and over claims 1-33 and 57 of U.S. Application No. 09/742,366.

Applicants respectfully request that these rejections continue to be held in abeyance until allowable subject matter is indicated.

Other Matters

Applicants acknowledge with appreciation the Examiner's previous consideration of the documents submitted by Applicants in Information Disclosure Statements (IDS) in the present application on the respective dates of February 22, 2002, June 27, 2002, and August 29, 2002. Applicants note that they have subsequently submitted additional documents in a Third Supplemental IDS filed at the USPTO on May 9, 2003. Thus, Applicants respectfully request that the Examiner provide an indication of her consideration of these documents in a future communication.

Conclusion

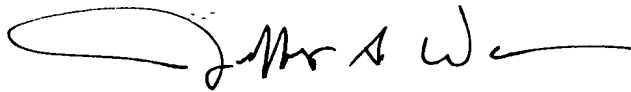
All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will

expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

A handwritten signature in black ink, appearing to read "Jeffrey S. Weaver", is written over a horizontal line.

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